

REMARKS

This Amendment is filed to respond to various rejections raised during the prosecution of the application to this point. In response to previous rejections, Applicant has amended independent Claim 1 and cancelled dependent Claims 10-13. Applicant has also added new independent Claims 22 and 23. Applicant respectfully submits that the claims of the application include recitations that patentably define over the cited references, taken either individually or in combination. In light of this, Applicant respectfully requests reconsideration and allowance of the application.

I. The Claims Are Definite

In previous correspondence, the claims have been rejected under 35 U.S.C. § 112, second paragraph due to the term “exit of the paper machine.” It has been alleged that this term is indefinite. This term has been deleted from amended independent Claim 1 and is not present in newly added independent Claims 23 and 24. As such, this rejection is hereby overcome. Applicant respectfully submits that the claims are definite.

III. The Claims Are Patentable

In previous prosecution, all of the claims of the application have been rejected under 35 U.S.C. § 103(a). Specifically, the claims have been rejected as obvious in light of the Rudit ‘990 patent by itself or in combination with one of the following references: U.S. Patent No. 5,822,070 to Syré; Tappi article by Vickery; U.S. Patent No. 5,011,573 to Niemi; U.S. Patent No. 5,118,195 to Dobbie and U.S. Patent No. 5,696,591 to Bilhorn et al. Applicant respectfully disagrees with these rejections in light of the following comments.

1. Analyzing Images from a Thermal Camera in Real Time

Applicant respectfully submits that none of the cited references, taken either individually or in combination, teaches or suggests the step of analyzing images from the thermal camera in real time as the images are captured by the thermal camera in order to detect defects in the paper web based on the images as recited in amended independent Claims 1 and 22. The emphasis

here is the direct use of the images to detect defects in real time, which is not taught or suggested by the cited references. Specifically, in the present invention, the web is monitored with a thermal camera to continuously control the quality of the web. The actual images from the camera themselves are directly analyzed in real time by the person controlling the process to detect defects. If the controller finds a defect in the web illustrated in the images, the controller begins altering the process parameters immediately to remove those unwanted features he or she found in the web from the images. The idea is that immediately, when something unwanted in the web is discovered from the images provided by the camera, the process is controlled to remove the defects in a real time basis.

This is contrary to the cited references. In the prior art, the camera images are only used as a secondary or a back up source of information. They are not used directly to detect defects in the web in real time as the images are captured, as recited in amended independent Claims 1 and 23. Instead, as described at col. 7, line 23 - col. 8, line 15, the Rudt '990 patent uses deviation detectors to directly detect defects in the paper web, and the camera images are only used later as a secondary source to discover problems with the paper web. This makes the system of the Rudt '990 patent less robust than the claimed invention.

More specifically, the Rudt '990 patent discloses a system having a monitoring means (10) having cameras to capture pictures of the web. The pictures received from the monitoring means are converted to a digital form and stored in a data storage means. Further, the system of the Rudt '990 patent discloses deviation detectors (38), which are not defined but are discussed as separate devices from the monitoring system. The deviation detectors detect deviations in the paper web separately from the monitoring means. Further, when the deviation detectors (38) detect a deviation, the detectors send a deviation signal to inform the control system (46) about the deviation. Only after the deviation detectors have detected a defect is the stored digital data from the images taken by the cameras of the monitoring means searched to display the defects sensed by the deviation detectors.

Importantly, the images from the camera are not used directly and continuously in real time as the images are captured to determine deviations and control or adjust the manufacturing process, as recited in amended independent Claim 1. Instead, the detection of defects in the

paper web in the Rudt '990 patent is from the deviation detectors 38, not the images from the camera. In other words, a person using the system of the Rudt '990 patent does not directly and continuously analyze the images from the camera in real time to detect defects in the web. As the Rudt '990 patent fails to teach or suggest direct use of the images to detect defects in the paper web, Applicant respectfully submits that amended independent Claims 1 and 22, as well as the claims that depend therefrom, is patentable over the cited reference.

2. Adjusting the Process in Real Time Based on Camera Images

Independent Claim 1 further recites "adjusting at least one of the manufacturing process and the treatment process for the paper web based on the detected defects determined from the images in real time." As mentioned above, the system of the Rudt '990 patent does not adjust the process parameters in real time based on the images. Instead, the system in the Rudt '990 patent first detects defects using defect detectors, then looks at the images stored in a database, and then only may make changes to the process. There is a delay associated with the procedures disclosed in the Rudt '990 patent. Process adjustments do not occur in real time. Further, the images are not used for real time inspection or adjustment. As such, independent Claim 1 is patentable for this additional reason.

3. Independent of Storing the Images

Independent Claim 24 recites "detecting defects in the paper web directly from the images as they are captured such that there is not a requirement to store the images for later analysis. As discussed above, the system of the claimed invention detects defects in the paper directly from the images as they are captured. This is not the case in the system described in the Rudt '990 patent. The system of the Rudt '990 patent does not directly analyze the images as they are captured. Instead, the Rudt '990 system stores the images as they are received and only views the images after a defect in the paper web has been detected by other means. The Rudt '990 system thus requires that the images be stored, which is not the case with the claimed invention. As such, independent Claim 24 is patentable over the cited references.

In re: Jari-Matti Karjanmaa
Appl. No.: 09/916,410
Filed: July 27, 2001
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CONCLUSION

In view of the amended claim, added claims, and the remarks presented above, it is respectfully submitted that all of the present claims of the application are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicant's undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

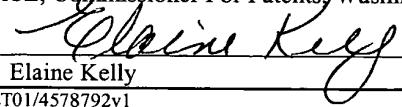


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Elaine Kelly

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Version with Markings to Show Changes Made:

In the Claims:

Please cancel Claims 10-13, and amend Claim 1 as follows:

1. (Twice Amended) A method for monitoring and controlling quality of a paper web as the paper web is being manufactured [in a paper machine], comprising:
 - conveying the paper web [from an exit of] through a [the] paper machine where the paper web is formed as part of a manufacturing process and treating the paper web by subjecting the paper web to a treatment process;
 - imaging the paper web with a thermal camera on a continual basis;
 - analyzing images from the thermal camera in real time as the images are captured by the thermal camera on a continual basis in order to detect defects in the paper web based on the images; and
 - adjusting at least one of the manufacturing process and the treatment process for the paper web based on the detected defects determined from the images in real time.